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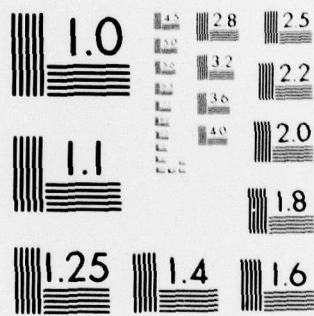


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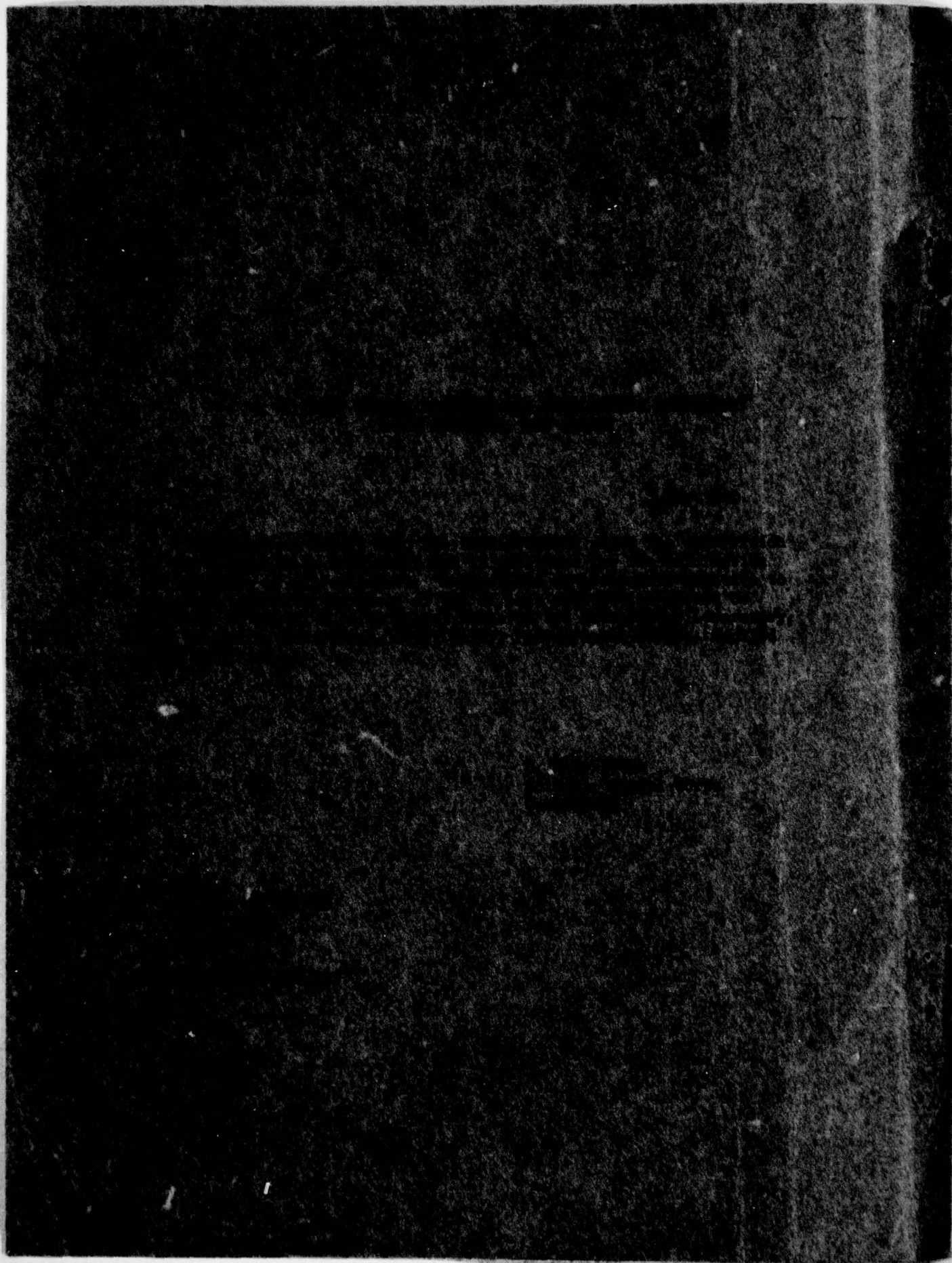
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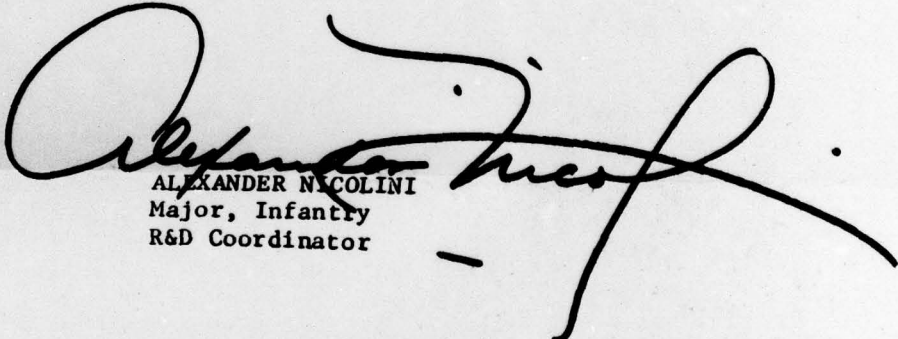
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11 2 May 1960

12 12 p.

14 USASRD Test Report-1480

6 EVALUATION OF VIEWER, 3 1/2" X 4" AND 70MM STRIP, *Inch* *Inch*

10 L. D. GOLDFARB  
GEORGE GORDON

DA TASK NR. 3D33-18-CC1-C1

U. S. ARMY SIGNAL RESEARCH AND DEVELOPMENT LABORATORY  
FORT MONMOUTH, N. J.

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#### ABSTRACT

The viewer, a portable optical device operating from 115 VAC, is designed to produce an enlarged illuminated image on a viewing screen. Either  $3\frac{1}{4} \times 4$  slides or 70mm strip transparencies can be used with the viewer.

Tests performed on the viewer are discussed. In general the viewer was found to be in accordance with the technical requirements.

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## EVALUATION OF VIEWER, 3 1/4" X 4" AND 70MM STRIP

### INTRODUCTION

The viewer is an optical device designed to produce an illuminated image on a viewing screen. The image is a 4X enlargement of either a 3 1/4" x 4" slide or a single frame of 70mm transparency film in the form of a continuous roll.

Individual holders are provided for either type of operation. The slide holder accepts Polaroid 46-L Transparency Film or other transparencies in type #632 mounts. The roll film holder receives 70mm Transparency Film directly from the Polaroid model P-261-1(1) Processor and arranges it for display.

These transparency films are illuminated by means of a projection lamp, reflector, and a set of condensing lenses. A disc of heat absorbing glass prevents excessive heat from reaching the film. The projection lens displays the magnified image on the screen. A mirror is used to fold the optical path, permitting the screen to be situated in the best position for direct viewing by the operator.

The screen and adjacent cabinet sections are hinged to fold and provide a more compact unit. In addition a carrying case is provided for ease of handling under field conditions.

The viewer requires 5 amperes of 115-volt, 60-cycle alternating current. Its dimensions are 9 1/2" x 16" x 23-3/4" and the combined weight of viewer and carrying case is 43 pounds.

### TEST APPARATUS AND MATERIALS

Camera KE-4 was used to expose the negative 70mm film which was processed in the 70mm Continuous Land Processor, producing positive transparencies which were used in the testing of the viewer. The climatic tests were performed utilizing the test facilities of the Equipment Evaluation Branch, USASRDL, Fort Monmouth, N. J. Polaroid film type 15-220 was utilized; Number 623 Polaroid transparency mounts were utilized.

### PROCEDURE AND RESULTS

#### *Visual Inspection*

A visual inspection of the viewer indicated the workmanship and construction to be good. No damage to the viewers from shipment could be detected.

#### *Operational Test*

Twelve viewers were operated utilizing both slide and roll film methods of operation. In each case an image of good quality was displayed on the viewer screen. The transparency slide mechanism and strip film transport mechanism operated satisfactorily. The screen was well illuminated, and sharp focus was obtained by means of the focusing control.

Three undesirable characteristics of the viewer were determined during the operational tests:

1. The forced air cooling is accomplished by the use of a blower driven by a DC motor powered through rectifiers. The use of rectifiers could be eliminated by the substitution of an AC motor. Also, the motor-blower combination utilized has an annoying noise level.
2. The location of the blower vent permits the hot air to rise into the operator's face.
3. The configuration of the viewer prohibits the insertion or removal of a roll of transparencies when the transport mechanism is in operating position. Also, to insert or remove the transport

mechanism from the viewer, the spool of transparencies must be on the right side when facing the viewer. To obtain the correct orientation of the transparency for projection the spool, as it comes from the processor, must be placed on the left of the transport mechanism, then respooled to the right side to allow insertion into the viewer.

#### ***Environmental Tests***

1. **Extreme Temperature Test:** After being subjected to the Extreme Temperature Test in accordance with MIL-Std-169, the viewer operated as it had before the test and no damage from the test could be detected.

2. **Moisture Resistance Test Cycle:** The viewer was subjected to the Moisture Resistance Test in accordance with MIL-Std-170. After this test the viewer operated as it had before the test; however, the "stay hinges", washers, and lens mounting bracket had rusted.

#### **CONCLUSIONS**

The viewer produces good quality enlarged reproductions of  $3\frac{1}{4}$ " x 4" and 70mm continuous strip transparencies with sufficient brilliance to be viewed in a normally lighted room. The viewer operation was not affected by the moisture resistance and extreme temperature tests; however, these tests did cause some of the parts to rust.

The design of the viewer could be enhanced for more efficient operation as discussed in the following paragraph.

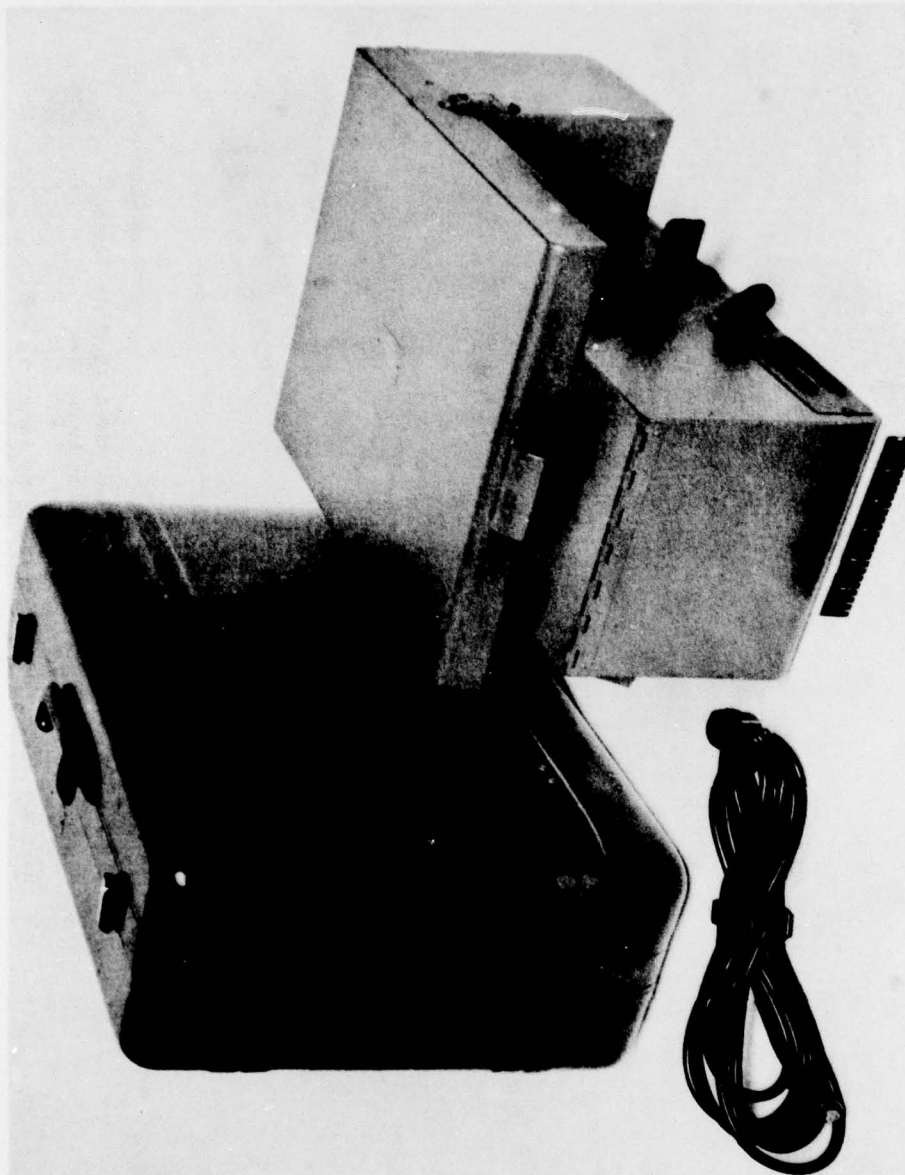
#### **RECOMMENDATIONS**

Prior to the acquisition of any further models the following changes are recommended:

1. Redesign the cooling system to vent the hot air away from the operator, reduce noise level, and substitute AC blower motors for the DC motors presently used.
2. Redesign configuration of viewer housing to allow insertion or removal of a roll of transparencies from the transport mechanism while it is in operating position.
3. Utilize corrosion resistant materials in the construction of the viewer or use better grade finishes to prevent corrosion.

#### **ACKNOWLEDGEMENT**

The authors wish to thank Sgt. William Franklin for his assistance in performing the tests upon which this report is based.



SIGFM/EL.59-1709

Figure 1

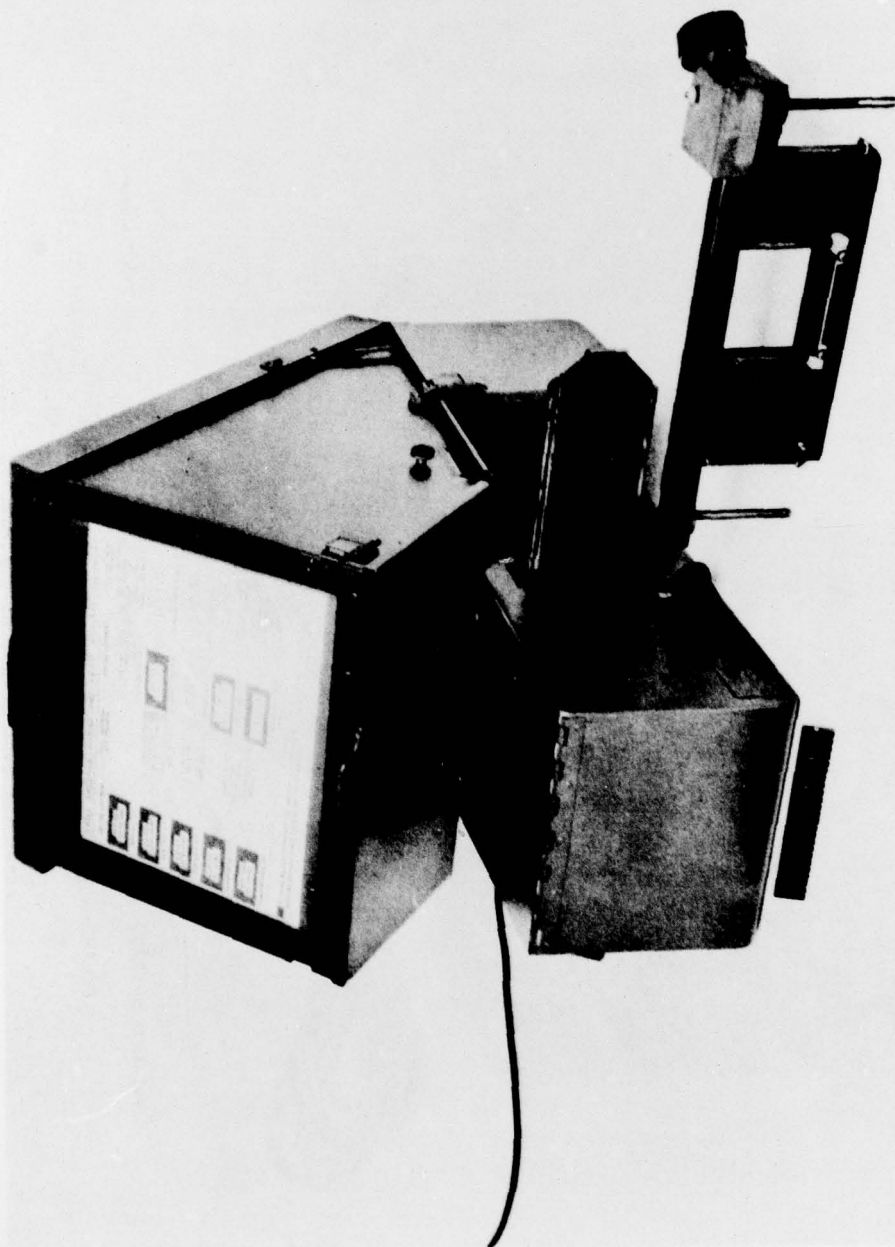
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POLAROID VIEWER, PORTABLE, 3 1/4" x 4" AND 70MM. (SERVICE-TEST)  
 USED WITH PROCESSOR, CONTINUOUS, LAND, 70MM  
 MFR. POLAROID CORP.

FRONT 3/4 VIEW. SHOWING VIEWER WITH CARRYING CASE  
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SIGFM/EL-59-1710

Figure 2

POLAROID VIEWER, PORTABLE, 3 1/4" x 4" AND 70MM. (SERVICE-TEST)

USED WITH PROCESSOR, CONTINUOUS, LAND, 70MM

MFR. POLAROID CORP.

FRONT 3/4 VIEW - SHOWING SLIDE BEING PROJECTED AND

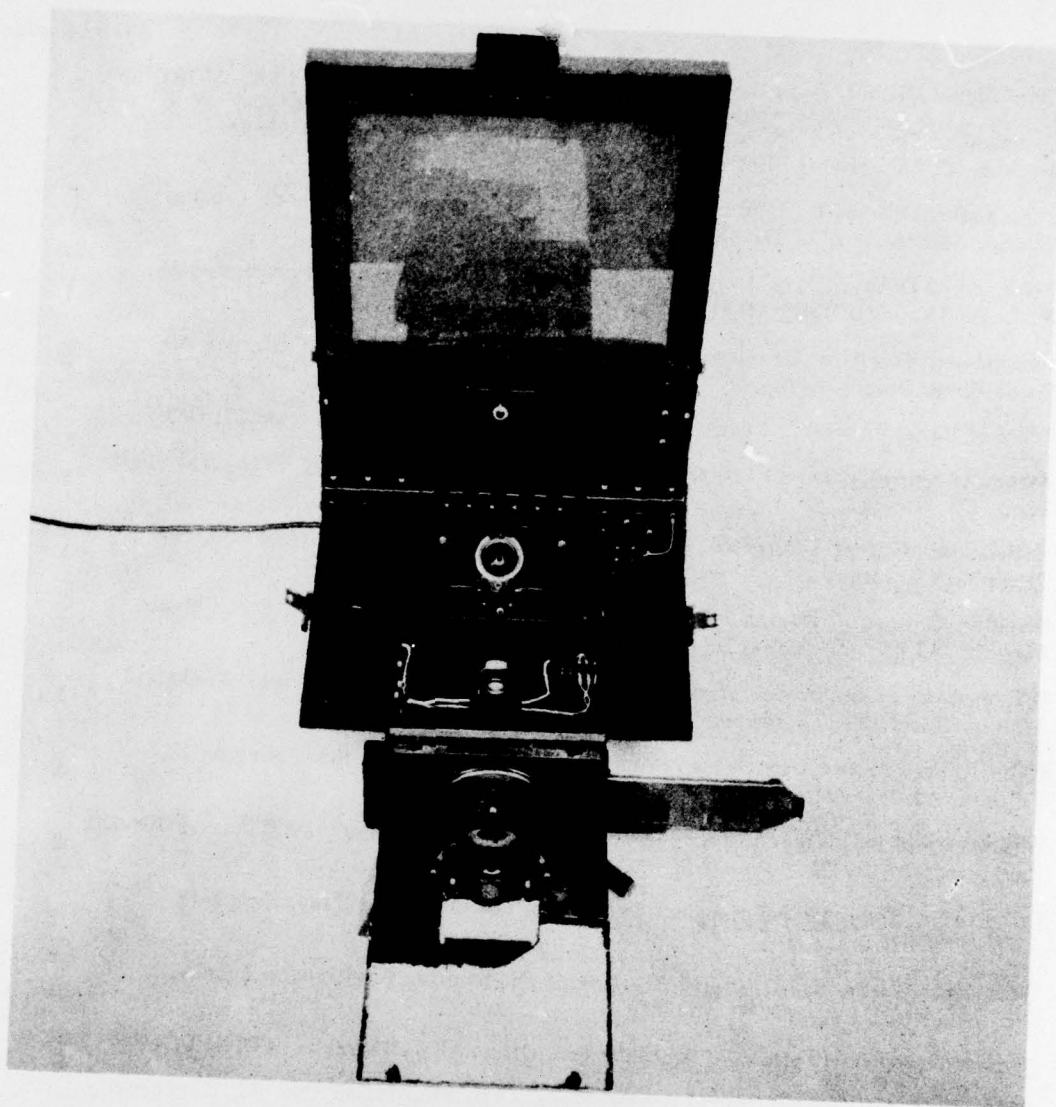
REAR VIEW OF 70MM ROLL FILM HOLDER

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Figure 3

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POLAROID VIEWER, PORTABLE, 3 1/4" x 4" AND 70MM . (SERVICE-TEST)  
USED WITH PROCESSOR, CONTINUOUS, LAND, 70MM  
MFR. POLAROID CORP.  
TOP 3/4 VIEW, VIEWER OPENED . SHOWING DETAILS OF PROJECTION SYSTEM  
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